Orbital Backtracking Field Definintions

Related Terms

Term	Definition
circular latitude	*(From Ross Swick's BOSA Technical Note)* a convenient way to encapsulate the latitude and direction of the satellite in a single number. Ideally the circular latitude would simply be the angular distance from the ascending equatorial crossing, but for our purposes it is more convenient to correlate the circular latitude to the actual latitude of the satellite along-track. This creates a (pseudo-) circular latitude that is a discontinuous function.
ascending	traveling from south to north, i.e., from lower latitude to higher latitude
descending	traveling from north to south, i.e., from higher latitude to lower latitude

Note: The following definitions describe the various fields as currently (as of May 26, 2015) used in the CMR implementation of the Backtrack Orbit Search Algorithm (BOSA). Fields marked with an asterisk (*), i.e., the circular latitude fields, are open to a different interpretation as given in the Alternative Interpretations for Circular Latitude Terms section.

Collection Fields

Field	Definition	ECHO-10 Field
swath-width	the width (in km) of the field of view of the sensor at the equator	OrbitParameters/SwathWidth
period	the time in minutes the satellite takes to make one full orbit	OrbitParameters/Period
inclination-angle	the heading (in degrees) of the satellite as it crosses the equator on the ascending pass	OrbitParameters/InclinationAngle
number-of-orbits	the number of full orbits composing each granule. This may be a fraction of an orbit.	OrbitParameters/NumberOfOrbits
start-circular-latitude*	the angular (in degrees) distance along the orbital path from the equator at which a collection begins.	OrbitParameters/StartCircularLatitude

Granule Fields

Field	Definition	ECHO-10 Field
start-lat	the (real) latitude at which the granule begins	HorizontalSpatialDomain/Orbit/StartLat
start-direction	the direction of the satellite at the start of the granule. This can either be ascending or descending.	HorizontalSpatialDomain/Orbit/StartDirection
orbit-start-clat*	the circular latitude at which the granule begins. This is equivalent to the angular distance travelled along the orbital path since the last ascending equator crossing.	Derived from start-lat
end-lat	the (real) latitude at which the granule ends	HorizontalSpatialDomain/Orbit/EndLat
end-direction	the direction of the satellite at the end of the granule (ascending or descending)	HorizontalSpatialDomain/Orbit/EndDirection
orbit-end-clat*	the circular latitude at which the granule ends. This is equivalent to the angular distance travelled along the orbital path since the last ascending equator crossing before the granule began.	Derived from end-lat

orbit-asc-crossing-lon	the longitude (in degrees) of the equatorial crossing on the ascending pass. According to the ECHO-10 schema > *The convention we've been using is it's the first included ascending crossing if one is included, and the prior ascending crossing if none is included (e.g. descending half orbits).* The word "included" here means a granule makes an ascending crossing. For fractional orbit granules this is often not the case, so the preceding ascending crossing is used. NOTE: This does not appear to be the case for some NSIDC granules, e.g., GLAH06_634_1102_028_0117_4_01_0001.H5 that lists the ascending crossing at 70 degrees (the previous crossing), whereas the granule includes an ascending crossing at 46 degrees. This contributed to the issues recorded in CMR-1168.	HorizontalSpatialDomain/Orbit/AscendingCrossing

Alternative Interpretations for Circular Latitude Terms

Field	Definition
start-circular-latitude	The actual latitude of the collection starting point.
orbit-start-clat	The actual latitude of the granule starting point normalized to -360,360 with respect to the equator crossing. Thus a fractional granule that includes an ascending crossing would have a negative orbit-start-clat (because the start would be prior to the crossing and south of the equator). Whereas other fractional orbit granules would reference the previous crossing and thus always have a positive orbit-start-clat.
orbit-end-clat	The actual latitude of the granule end point normalized to 0,360 with respect to the equator crossing. This would always be positive because it would always occur after the equator crossing.